



A200 SMIF POD

Recommended preventative maintenance



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Overview

Preventative maintenance of the A200 200 mm SMIF Pod includes five key actions that are performed periodically to prevent larger problems with product performance:

1. Cleaning and drying
2. Periodic replacement parts
3. Functional inspection
4. Visual inspection
5. Dimensional inspection

A brief overview is provided in the tables below. Frequencies and times are approximate. Frequency is recommended based on level of risk (is the failure catastrophic for the contents?), potential frequency of failure and ease of inspection. Detailed information and procedures are provided following the tables.

Ninety-day Inspection Guidelines

Recommended inspections for every cleaning cycle, every 90 days or after an incident.

Action	Time	Criteria	Description	Corrective Action
Cleaning and drying	Per customer cycle	Cleanliness	Verify shell and door cleanliness	Clean pod using approved method
Visual inspection	15 seconds	Cracking or splitting	Inspect for partial splits or breaks, or a separation of material	Discontinue use and consult Entegris, Inc.
		Scratches (internal shell surface)	Inspect for thin or shallow cuts, which could potentially release particles from the shell surface	Discontinue use due to potential contamination risk and review pod handling procedures
		Chipping or broken edges	Inspect for areas where a section of material is missing, potentially causing a functional issue	Discontinue use and review pod handling procedures
		Alignment tabs/pins	Inspect for pins that are bent or broken off. Damaged pins could allow a door to be inserted backwards.	Discontinue use and review pod handling procedures
		Chemical attack (crazing, pitting)	Inspect for crazing or pitting due to chemical attack	Discontinue use and consult with Entegris, Inc.
		Gasket wear	Inspect gasket for cuts and nicks. Also verify that the gasket is seated completely in its channel.	If cuts or nicks are discovered, replace gasket
		Cassette Hold Down (CHD)	Inspect the cassette spring for proper placement and signs of degradation	Re-install CHD if undamaged or replace
		Waferlock	Verify all parts are present and installed properly	Remove from service and determine root cause
		Waferlock	Verify knife edge of waferlock is free of nicks, cuts and damage	Remove from service and replace
Functional inspection	15 seconds	Waferlock	Verify the waferlock frame is not warped, deformed or damaged	Remove from service and determine root cause
		Waferlock	Verify the waferlock functions properly	Remove from service and determine root cause

Six-month Inspection Guidelines

Recommended inspections for every sixth cleaning cycle, every six months or after an incident.

Action	Time	Criteria	Description	Customer Action
Visual inspection	15 seconds	Door screws	Inspect for visibly loose (coming out) or missing screws	Tighten or replace screws
Functional inspection	45 seconds	Door closing torque	Amount of force required to fully lock the door mechanism. Closed <15 in/lbs	Determine root cause, remove door from service
		Door opening torque	Amount of force required to fully lock the door mechanism. Open ≥2.5 in/lbs	Determine root cause, remove door from service

Annual Inspection Guidelines

Recommended inspections for every 12th cleaning cycle, every year or after an incident.

Action	Time	Criteria	Description	Customer Action
Periodic replacement parts	2 minutes	Gasket	Replace gasket	Gasket Kit (20 gaskets per kit): P/N 9700-4246-XX (last 2 numbers TBD at order time)
	1 minute	Waferlock and wheel	Replace waferlock and wheel	Waferlock and Wheel Only Kit (50 per kit): P/N 9700-9667-01
	2 minutes	Cassette Hold Down (CHD)	Replace CHD	Kit number depends on CHD style. Contact Entegris for part number.
Visual inspection	15 seconds	Automation button (top robotic flange, AK handle)	Inspect for general damage and verify tightness	Replace damaged part, tighten loose screws
	15 seconds	Ergo handles, side rails	Inspect for general damage and verify tightness	Replace damaged part, tighten loose screws
	15 seconds	Door cassette guides	Inspect for general damage, inspect for gap between door cover surface and bottom of guide	Replace damaged part, tighten loose screws
	1 minute	Door flatness	Verify door is flat	Replace door

Ninety-day Procedures

Pod Cleaning

The SMIF Pod provides a self-contained mini-environment for the protection of the product contained inside it. It protects the product from outside contamination when storing or moving the product from one location to another. The SMIF Pod will become dirty or contaminated during normal usage by failed seals on process tools, broken wafers, process chemical exposure and general handling.

GENERAL GUIDELINES

Frequency (est.):	Every 90 days Before each new lot of wafers After a cleanliness event
Time to perform (est.):	Variable
Required parts:	None
Required tools and equipment:	Pod opener, screwdriver, cleaning equipment

Procedures

Shell Assembly

- The shell assembly may be cleaned using all available cleaning technologies. Whether wet or dry, rotation, immersion or spray process depends on your specific requirements and budget priorities. Experience has shown that in most cases, the spray process provides sufficient cleanliness.
- Entegris supports both the use of no and very low concentrations of surfactants, followed by a pure DI water rinse
- All process or drying temperatures of hot DI water and clean dry air or nitrogen shall never exceed 60°C
- To manually separate the shell from the door, Entegris offers a small hand tool, but there are also more sophisticated and automatic pod openers available

- The shell assembly can be cleaned as one piece, however some immersion processes may cause water to be forced into areas where parts are screwed to the assembly. If testing shows water traps, drying conditions may be changed in the tool or disassembly may be required. Certain cleaning processes may also affect the waferlock mechanism and require removal of the waferlock to prevent damage.

Door Assembly

- The door assembly may be cleaned by hand—wipe down with isopropyl alcohol or DI water
- The gasket should be removed prior to cleaning, inspected for signs of wear or discoloration and replaced yearly. Entegris offers a special tool to correctly and easily seat the gasket in the door gasket grooves after the wipe down, if necessary.
- Immersion and spray washes are not recommended for the door

After cleaning of shell and door is complete, they should be assembled together as quickly as possible to keep the product's internal mini-environment as clean as possible. If any residual humidity is visual, the drying cycle shall be repeated.

Visual Inspection

Inspect the pod to do a quick visual check for damaged parts and surfaces that could affect pod performance. This inspection can easily be performed in conjunction with pod cleaning.

GENERAL GUIDELINES

Frequency (est.):	Every 90 days or before each new lot of wafers
Time to perform (est.):	2 minutes, 30 seconds
Required parts:	None
Required tools and equipment:	None; wafer inspection light recommended

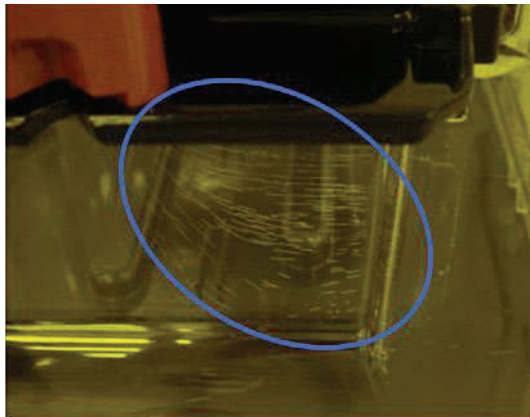
Procedures

Shell Assembly

1. Visually inspect the shell surface—focusing especially on the surfaces inside the mini-environment—for cracks, scratches and evidence of chemical attack, such as crazing or pitting. Surface defects in the plastic can make cleaning difficult and be a potential source of particles sloughing off the surface of the plastic. Crazing on the outside of the shells should not significantly impact pod performance or lifetime.



Chemical attack/splash



Crazing on outside of shell—note how shallow the cracks are

2. Visually inspect for chipped and broken edges. Focus on the knife edge where the door seals and the bottom of the shell.

3. Visually inspect the CHD for warpage or improper installation. There will be no gap between the CHD and the shell in a proper installation. See the picture below for an improperly installed CHD.



Cassette Hold Down (CHD) gap

4. Inspect the waferlock to ensure that all parts are present (two PEEK screws, frame, two pivots, waferlock, wheel). Check that the waferlock is properly attached to both pivots and that the wheel is properly seated.



Waferlock components

5. Feel the knife edge of the waferlock for nicks and cuts. Sharp edges on the waferlock can lift the wafers and break them on the carrier.



Waferlock pod nicks and cuts

6. Ensure that the waferlock pin is touching the dome wall.



Waferlock pin is touching the dome wall

Door Assembly

- Visually inspect the inner door surface for cracks, scratches and evidence of chemical attack, such as crazing or pitting. Surface defects in the plastic can make cleaning difficult and be a potential source of particles sloughing off the surface of the plastic.
- Inspect the gasket for proper installation and for cuts and nicks that could compromise the seal. The gasket should lay flat against the surface of the door.



- Inspect anti-rotation pins on two corners of the door for pins that are bent or sheared off. Missing pins can allow doors to be inserted into the pod backwards.

Functional Inspection

Inspect the performance of the waferlock to confirm proper operation.

GENERAL GUIDELINES

Frequency (est.):	Every 90 days
	Before each new lot of wafers
	After a waferlock performance event
Time to perform (est.):	30 seconds
Required parts:	None
Required tools and equipment:	None

Procedures

Cycle the waferlock slowly three times by hand. Feel for catching and hitching as you push the waferlock up to the closed position. Slowly lower the waferlock and make sure it does not hang up or bind in the closed position.

Six-month Procedures

Visual Inspection

Inspect the pod to do a quick visual check for damaged parts and surfaces that could affect pod performance. This inspection can easily be performed in conjunction with pod cleaning.

GENERAL GUIDELINES

Frequency (est.):	Approximately every 6 months
Time to perform (est.):	30 seconds
Required parts:	None
Required tools and equipment:	Philips head screwdriver

Procedures

Door Assembly

- Visually inspect door bottom for loose, protruding or missing screws. Run a hand over the bottom of the door to feel for protruding screws. If less than two screws are found to be loose or missing, they can be tightened or replaced with a screwdriver. If more than two screws have a problem, the door should be removed from service.

Functional Inspection

Check the performance of the pod door to make sure that it is unlikely to fail and cause a door drop incident. Door torque is a good indication of wear of door mechanisms.

GENERAL GUIDELINES

Frequency (est.):	Approximately every 6 months
Time to perform (est.):	2 minutes
Required parts:	None
Required tools and equipment:	Snap-on Tools Torqometer® or equivalent (model number TEC1FUA)
	Modified manual pod opener (base part number M200-0050)

Procedures

Door Assembly

- If measured door opening torque is below 2.5 in/lbs or closing torque is above 15 in/lbs, it is likely there is something wrong with the door and it should be removed from service.
- With the door in the shell, slowly and steadily close or open the door using the manual opener and torqometer. Swift movement of the torque meter may give erroneous readings.

Annual Procedures

Periodic Replacement Parts

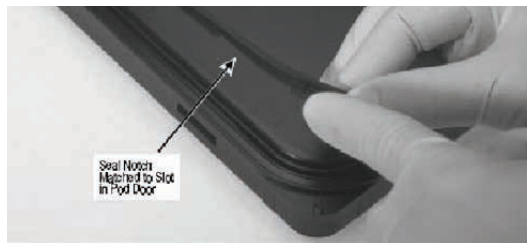
Some wear parts need periodic replacement. Ideally parts should be replaced before they start causing performance problems, not after wear and performance degradation has been observed.

GENERAL GUIDELINES

Procedure:	Gasket installation	Cassette hold down installation	Waferlock and wheel installation
Frequency (est.):	Approximately once every year	Approximately once every year	Approximately once every year
Time to perform (est.):	2 minutes	1 minute	2 minutes
Required parts:	Gasket kit: P/N 9700-4246-XX	Waferlock and wheel kit: P/N 9700-9667-01	CHD kit: P/N 9701- 0167-XX
Required tools and equipment:	Gasket installation tool: P/N M200-0070	None	CHD installation tool Rubber or dead strike mallet

Procedures

Gasket Installation Procedure



1. Place the seal on the pod door matching the two notches on each of two sides of the seal with the mating slots on the two sides of the pod door. This ensures correct orientation of the seal on the pod door.



2. Ensuring that the notches in the seal are properly aligned with the mating features in the pod door, press the seal into the groove around the perimeter of the pod door. It is generally

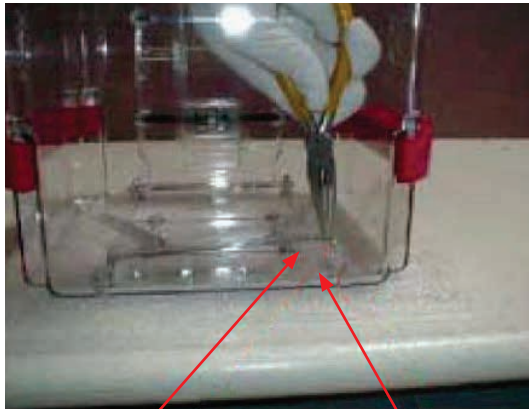
recommended to start with the four corners, then do the middle of each side, and then press the rest of the gasket into the groove.



3. Lightly push on the gasket roller tool while running the roller over the seal along the inside edge of the seal. First roll the straight sides, then the four corners. *Ensure that the outer edge of the seal does not hang over the flange of the door. The seal should be inside the flange.*
4. Inspect the seal for uniform installation and proper fit into the pod door groove. The top surface of the seal must be even and smooth.

Cassette Hold Down Installation Procedure

1. Place shell upside-down on a cushioned or non-abrasive surface so the shell is not scratched during this procedure.



CHD attachment post

Shell attachment boss

2. Remove existing CHD. This can be done by hand or with a pair of needle nose pliers. This may require “rocking” the CHD gently as you pull on it. Be careful not to pull too hard as the CHD can break off and leave material in the installation hole.

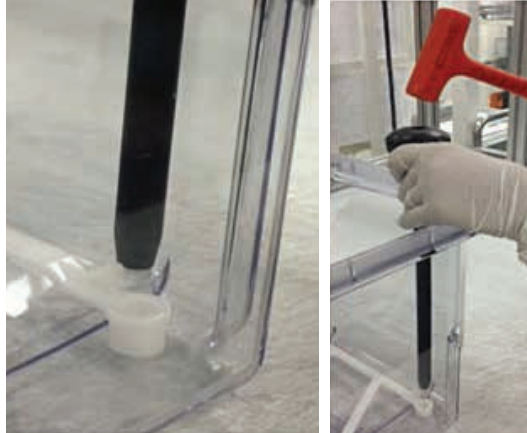
If the CHD is broken during installation, the remaining material in the installation hole can be removed with a hand drill.



Press here

Press here

3. Place new CHD over the installation holes and push in by hand as far as possible. Using a CHD installation tool, pound the CHD into the holes.



4. Make sure new CHD is fully installed. It is fully installed when the shoulder on the CHD is flush with the installation hole.



Correct: There is no gap between the CHD and the shell



Incorrect: Notice the gap between the CHD and the shell

Waferlock and Wheel Installation Procedure

1. Turn pod on its side with the opening facing you and the waferlock hanging from the top.
2. Grasp the sides of the waferlock—watching out for the sharp edges—and pull straight out of the pod. It should pull off of the pivots in one smooth motion.
3. Install the new waferlock and wheel assembly.

Visual Inspection

Inspect the pod to do a quick visual check for damaged parts and surfaces that could affect pod performance. This inspection can easily be performed in conjunction with pod cleaning.

GENERAL GUIDELINES

Frequency (est.):	Approximately once per year
Time to perform (est.):	2 minutes
Required parts:	None
Required tools and equipment:	None

Procedures

Shell Assembly

- Inspect tightness of AK flange installation if one is installed on the pod. Inspect the flange for damage or excessive wear.



- Inspect tightness of side handle installation. Inspect the handles for damage or excessive wear.







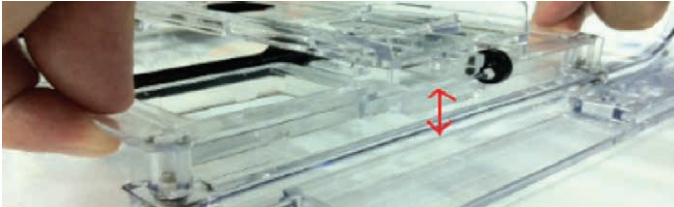
Door Assembly

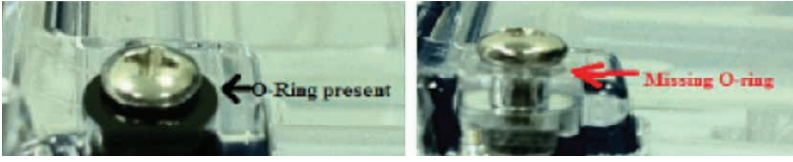

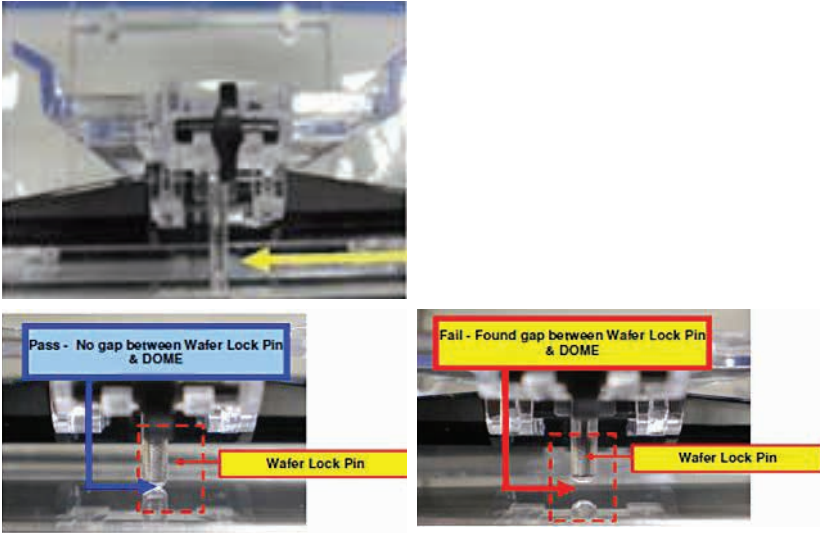
- Inspect door cassette guides for damage or wear. Make sure they are installed tightly to the door by looking for a gap around the bottom.



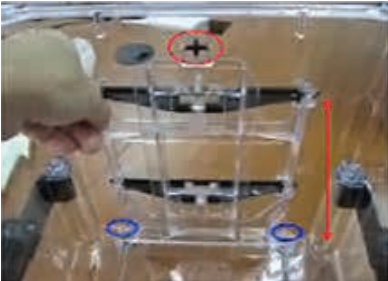
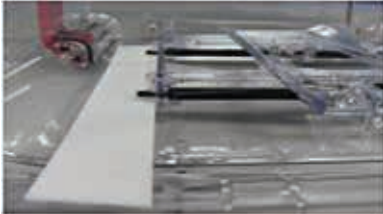
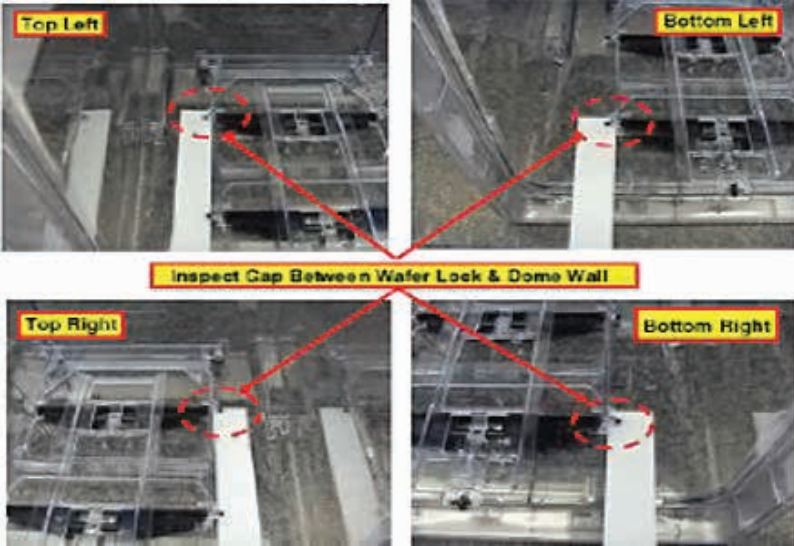
- Inspect door flatness. Place door on a granite table and using a 0.020" feeler gauge inspect the edges of the door. Doors that allow the feeler gauge under them should be removed from service.

A200 Waferlock Assembly Checklist for Gen V Dome

Check Item and Visual Aid	Result
<div>1. Hand pull the waferlock frame to make sure it's fully seated and tightly attach on dome</div> <div>Lift the pivot and make sure the retainer moves freely. Perform three cycles. Rotate the wheel and make sure it can spin freely.</div> <div></div>	<div>Waferlock Frame: <input type="checkbox"/> Tight <input type="checkbox"/> Loose</div> <div>Pivot: <input type="checkbox"/> Moves freely <input type="checkbox"/> Stuck</div> <div>Wheel: <input type="checkbox"/> Spins freely <input type="checkbox"/> Jammed</div> <div>Remarks:</div>
<div>2. Make sure the waferlock frame edge is fully positioned in the dome rib slot</div> <div></div> <div></div> <div></div> <div><i>Correct</i><i>Incorrect</i></div>	<div>Waferlock Frame Edge: <input type="checkbox"/> Slot in <input type="checkbox"/> Slot out</div> <div>Remarks:</div>
<div>3. Make sure the waferlock leg is fully inserted into dome boss hole with no gap</div> <div></div> <div></div> <div><i>Correct: no gap</i><i>Incorrect: gap</i></div>	<div>Waferlock Leg: <input type="checkbox"/> No gap <input type="checkbox"/> Gap</div> <div>Remarks:</div>
<div>4. Make sure the waferlock frame is not dislodged from dome</div> <div></div>	<div>Waferlock Frame: <input type="checkbox"/> Not <input type="checkbox"/> Dislodged dislodged</div> <div>Remarks:</div>

Check Item and Visual Aid	Result
<p>5. Make sure the waferlock o-ring is present</p> 	<p>Waferlock O-ring: <input type="checkbox"/> Present <input type="checkbox"/> Missing Remarks:</p>
<p>6. Make sure the waferlock screw is fully torqued</p> 	<p>Screw Torque: <input type="checkbox"/> No gap <input type="checkbox"/> Gap Remarks: Screw torqued at 6 in•lbf</p>
<p>7. Make sure the waferlock pod dowel pin touches the dome wall</p> 	<p>Waferlock dowel pin: <input type="checkbox"/> Touching <input type="checkbox"/> Gap Remarks:</p>

A200 Waferlock Assembly Checklist for Gen IV Dome

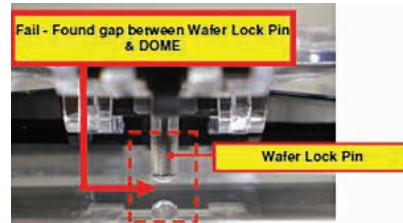
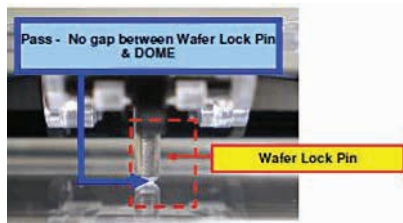
Check Item and Visual Aid	Result
<div>1. Hand pull the waferlock frame to make sure it's fully seated and tight, and check the screw to make sure it's straight Lift the pivot and make sure the retainer moves freely. Perform three cycles. Rotate the wheel and make sure it can spin freely.</div> <div></div>	<div>Waferlock Frame: <input type="checkbox"/> Tight <input type="checkbox"/> Loose <input type="checkbox"/> Straight <input type="checkbox"/> Tilted</div> <div>Screw: <input type="checkbox"/> Tight <input type="checkbox"/> Loose</div> <div>Retainer: <input type="checkbox"/> Moves freely <input type="checkbox"/> Stuck</div> <div>Wheel: <input type="checkbox"/> Spins freely <input type="checkbox"/> Jammed</div> <div>Remarks: Screw torqued at 3 in•lbf</div>
<div>2. Make sure the waferlock lock is not tilted (<0.06") by using the Teflon feeler gauge. The gauge must not go through.</div> <div></div> <div><div><div>Top Left</div><div>Bottom Left</div><div>Top Right</div><div>Bottom Right</div></div><div>Inspect Gap Between Wafer Lock & Dome Wall</div></div>	<div>Feeler Gauge: <input type="checkbox"/> Pass <input type="checkbox"/> Fail</div> <div>Remarks:</div>

3. Make sure the waferlock frame touches the dome wall. No gap is allowed.

Waferlock Pin:

☐ Touching ☐ Gap

Remarks:



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